

similar results using a blanket of plastic film placed directly upon the infant. They also measured a significant reduction in air turbulence near the baby. The rapidity with which radiant heat requirements diminished in response to the blanket suggested that the immediate and perhaps major effect of such shielding is abrupt reduction of air turbulence and resultant convective and evaporative heat losses. A greenhouse effect is unlikely because ambient temperature and radiant energy requirements would change more gradually. Air turbulence is greater over open radiant cradles<sup>3</sup> than within incubators,<sup>4</sup> and this may contribute to the greater insensible water loss associated with radiant heaters. We did not measure air velocity, but we assume a reduced turbulence because the shield provided virtually complete enclosure. Reduced turbulence and raised ambient vapour pressure under the shield should decrease convective and evaporative heat losses. By reducing insensible water loss to levels reported for incubators,<sup>1 2 5</sup> the shield may eliminate a major objection to the protracted use of radiant warmers.

We used a plastic film cover (polyvinyl chloride) for the shield because Indyk<sup>6</sup> suggested that polyvinyl chloride-polyvinylidene film did not block transmittance of radiant energy significantly while Perspex did. Our study of five plastic materials has confirmed and extended his observations. The thin

film plastics that we tested should not interfere with warming.

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Correspondence to Dr C W Fitch, Newborn Center, 853 Jefferson Avenue, Room 301, Memphis, TN 38163, USA.

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## Traumatic perforation of the hypopharynx—an unusual form of abuse

H P McDOWELL AND D W FIELDING

*Department of Paediatrics, West Cheshire Maternity Hospital, Chester*

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**SUMMARY** Two infants presented with extensive interstitial emphysema of the neck as a result of non-accidental trauma to the pharynx. The clinical presentation, diagnosis, and management of this unusual form of child abuse is discussed.

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The variations in the clinical presentation of child abuse are legion. We describe two infants with erythematous swelling of the neck after non-accidental traumatic perforation of the hypopharynx complicated by haemorrhage, infection, and massive interstitial emphysema.

#### Case reports

**Case 1.** A 4 month old boy presented with a 24 hour history of feeding difficulty, coughing, and the production of bloodstained sputum. Examination showed respiratory distress, head retraction, pyrexia, and a rapidly progressing erythematous swelling of the anterolateral aspects of the neck over which crepitus could be felt. A linear abrasion was found on the soft palate; direct laryngoscopy showed fresh blood in the oropharynx and a haemorrhagic sloughing lesion on the posterior pharyngeal wall. Radiological examination showed extensive interstitial emphysema of the neck and three healing lower rib fractures, evidence of probable previous abuse.

Treatment was begun with nasogastric feeding and intravenous broad spectrum antibiotics but progressive respiratory distress necessitated ventilatory support. At that time the retropharyngeal tissues were inflamed and swollen and further inspection of the lesion showed a perforation of the posterior pharyngeal wall. A large retropharyngeal abscess, extending into the superior mediastinum, subsequently developed and required surgical drainage. Ventilatory support was necessary for two weeks but after this the infant made an uneventful recovery.

There was considerable suspicion of non-accidental injury when this infant was admitted to hospital as the parents had previously abused an elder sibling who was on the Child Abuse Register. No plausible explanation for this latest injury was given but a plastic cooking spatula with a sharp handle was produced and almost certainly was the instrument involved. The parents 'thought that the elder sibling (aged 2 years) had been playing with this and could have forced it down baby's throat.' After a non-accidental injury case conference, care proceedings were instigated in respect of both children who were made the subjects of care orders and placed in a long term foster home.

**Case 2.** A 3 month old boy was admitted to hospital with pyrexia, irritability, and an extensive erythematous swelling affecting the anterolateral aspects of the neck. Five hours previously his mother had seen a small amount of blood on his mouth and chin but no neck swelling was visible at that time. Laryngoscopy showed a large oval haemorrhagic lesion on the posterior pharyngeal wall with copious thick yellow mucus within the pharynx. Radiographic appearances of the neck showed extensive interstitial emphysema but no other bony or soft tissue injury was apparent. The infant was treated with intravenous broad spectrum antibiotics, fed via orogastric tube, and made a slow but uneventful recovery.

These parents were young common law husband and wife who had no previous history of child abuse but a lengthy list of convictions for fraud and grievous bodily harm. Again no plausible explanation was given for the injury. The mother had 'handed a teething ring' to her baby, left him with her husband while she prepared the feed, and the baby 'must have pushed it too far down.' Both parents were due to appear in court the following week on deception charges and the mother also for breach of probation. Both received sentences of three months in custody but as the result of an appeal the mother was released on probation after three weeks. The infant was placed on the Child

Abuse Register and returned to the care of his mother under a supervision order. The mother subsequently terminated her relationship with the father after his release from prison.

## Discussion

Child abuse may occur in many forms and present in numerous disguises.<sup>1 2</sup> Initial examination in both infants showed no serious lesion to explain their condition. Only after a thorough direct inspection with a laryngoscope were definitive lesions found. Perforation of the pharynx is a well described entity in neonates and infants,<sup>3</sup> predominantly secondary to endotracheal intubation, pharyngeal suction, or in situ nasogastric tubes. Management is controversial<sup>4</sup> as surgical intervention does not necessarily improve the prognosis, the tear often being located at operation. Outcome is improved by early diagnosis and prompt initiation of treatment. This includes broad spectrum antibiotics, adequate nutrition given parenterally or by nasogastric tube passed under direct vision, and possible chest drainage if the pleural cavity has been entered. Indications for surgical intervention include mediastinitis, the formation of a mediastinal mass (both having a high morbidity and mortality), and the development of a retropharyngeal abscess.

A review of the published reports has failed to find any reference to child abuse presenting with interstitial emphysema secondary to a traumatic perforation of the posterior pharyngeal wall. This is an unusual form of child abuse but may not be as rare as the reports suggest. An awareness of the clinical features, particularly the erythematous neck swelling, may lead to prompt recognition and treatment of a potentially fatal condition, avoiding the need for either surgical intervention or ventilatory support, or both. We would recommend early and thorough inspection of the pharynx by laryngoscopy if this condition is suspected.

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Correspondence to Dr D W Fielding, Department of Paediatrics, West Cheshire Maternity Hospital, Liverpool Road, Chester.

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